WASHINGTON STATE DEPARTMENT OF
Natural Resources

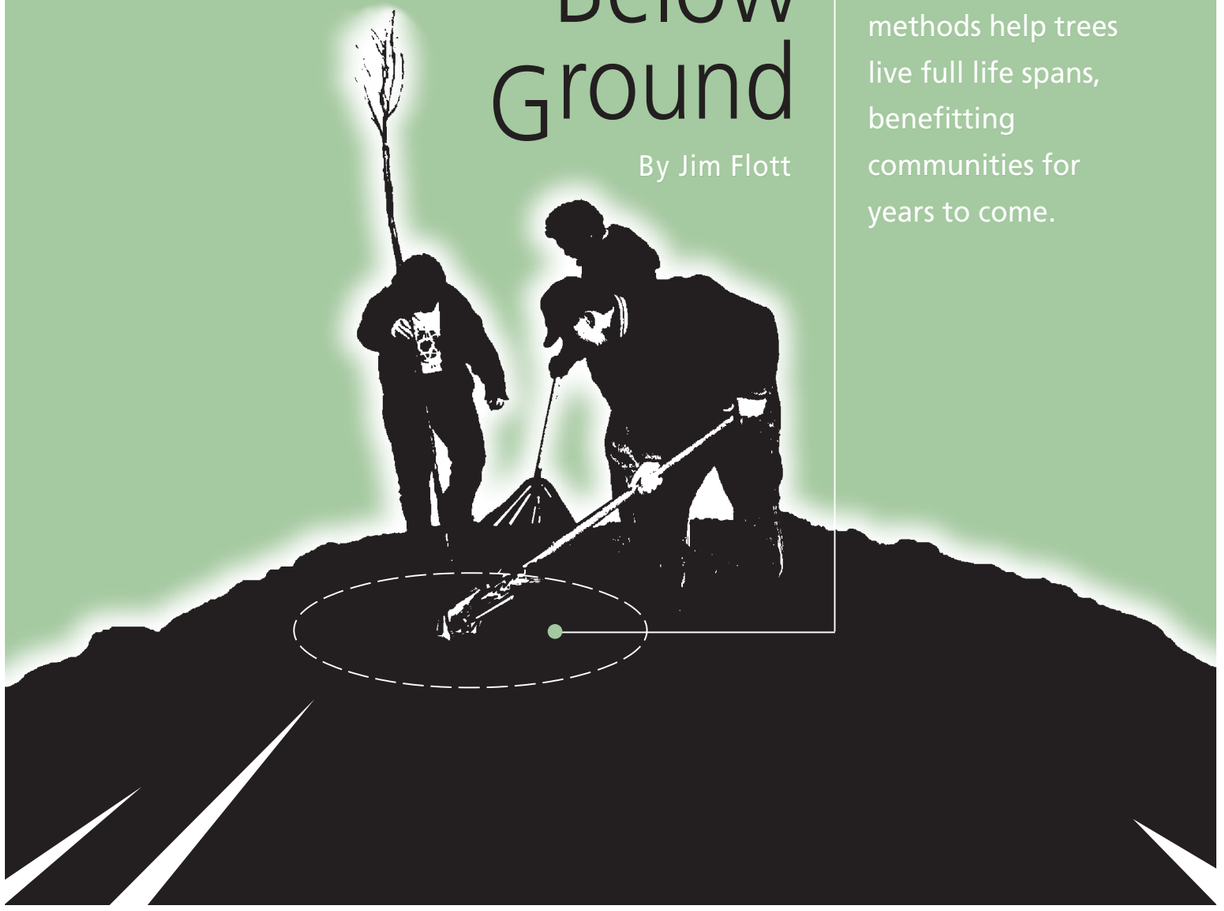
TreeLink

DNR COMMUNITY FORESTRY PROGRAM ✦ NUMBER 19 ✦ SPRING 2004

Proper Planting Begins Below Ground

By Jim Flott

New planting methods help trees live full life spans, benefitting communities for years to come.



"Don't disturb the root ball" is a myth. The truth is, most root balls need corrective pruning prior to planting.

Planting Solutions

Landscape trees often decline and die prematurely because they were planted too deeply or were too deep in the root ball or container from the outset. To give trees a good start to a long and healthy life, buy high quality nursery stock. Quality begins below ground. The root collar or trunk flare and the main roots should be at or near the surface of the container or B&B root ball. Avoid buying trees with more than four inches of soil over the root collar and main roots. Proper planting of the B&B, container nursery and bare root nursery stock requires the root collar to be at or slightly above the soil grade level.

Check B&B root balls and containerized nursery stock for circling and girdling roots. If circling roots are present, treatment is necessary to reduce the chances of stem girdling roots developing. There are many recommendations for treating circling roots. Circling roots, J-roots and hooked, kinked, and misshapen roots can often be corrected before they threaten the survival of your trees.

Scoring or slicing of the sides in four places and bottom of the container root ball is cited frequently as the prescribed treatment for circling roots, but it does not treat root issues in the interior of the root ball, nor does it treat a majority of the problems on the exterior surface of the root ball.

Conclusion

"Right tree, right place" is the message often expressed about tree planting and with warrant, but the success of right tree, right place begins below ground. Understanding tree root systems and how they affect the success of transplanted specimens will help you install trees correctly. The myth of planting trees is "You shouldn't disturb the root ball when transplanting trees." The truth is, the root ball often needs corrective root pruning before transplanting and treatment to locate the root collar. Planting specifications should state the planting hole depth be no deeper than the depth of the root ball, measured from the root collar to the bottom of the root ball. Plant trees correctly to ensure long-term health.

REFERENCES

McClure, S. 1991. Fatal Flaws. Overlooking Critical Practices for Planting B&B Material May Prove Deadly. American Nurseryman 11/1991.

Johnson, G.R. and B. Johnson. 2001. Stopping Stem-Girdling Root Damage. American Nurseryman 8/2001.

Harris, R.W., J.R. Clark and N.P. Matheny. 2004. Arboriculture. Integrated Management of Landscape Trees, Shrubs and Vines, Fourth Edition. Prentice Hall, Upper Saddle River, New Jersey.

Childs, R.D., D.C. Swanson and R.F. Kujawski. 2002. Cultural Practice Problems of Trees and Shrubs in the Landscape and Nursery. University of Massachusetts Department of Environmental Management Forest Health Program, Amherst, MA.

Watson G.W. and Himelick E.B. 1997. Principles and Practice of Planting Trees and Shrubs. International Society of Arboriculture, Illinois.

Washington Community Forestry Council

The Washington Community Forestry Council was organized by the Washington State Department of Natural Resources (DNR) in 1991. Its goal is to provide leadership and vision to help citizens preserve, plant and maintain community trees and forests. The Council consists of a general membership and an Executive Advisory Committee to the State Forester. Join by calling **1-800-523-TREE.**

"TreeLink" is a quarterly publication of the DNR Community Forestry Program. The program's purpose is to educate citizens and decision-makers about the economic, environmental, psychological and aesthetic benefits of trees and to assist local governments, citizen groups and volunteers in planting and sustaining healthy trees and vegetation wherever people live and work in Washington State.

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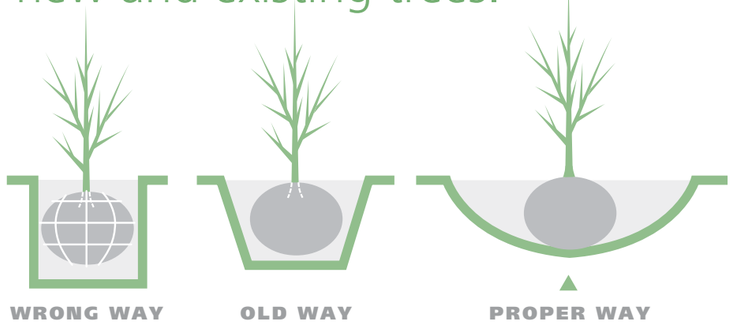
According to recent research, planting trees too deeply often leads to failure of new and existing trees.



Each year, communities are planting tens of thousands of trees in parks, greenspaces and along city streets. Many children, adults, government officials, civic groups and professionals participate in tree planting events.

To most people, planting a tree is the brief process of digging a hole and backfilling around the roots with soil. As communities across the nation are striving to restore urban forests, are their planting processes providing an environment in which trees will thrive? In many cases, the answer may be no.

Recent university research and field observations by arborists have led to the discovery that planting trees too deeply contributes to the decline and failure of new and existing trees, even those that have been part of the landscape for many years. This discovery has led to the need to re-educate people on the proper way to plant trees.

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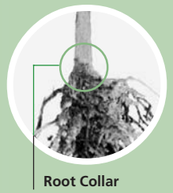
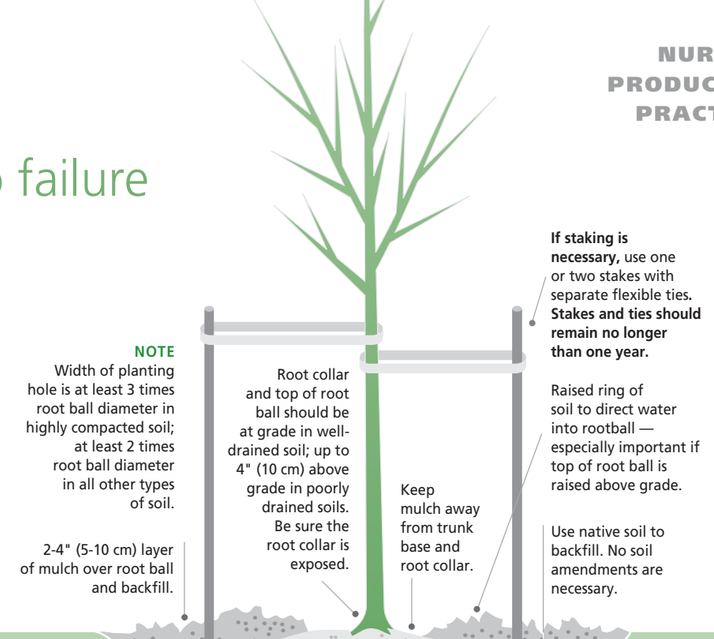
The Root of the Problem

Roots provide several essential functions, including structural support, water and mineral absorption and conduction, storage of carbohydrates, and synthesis of plant hormones. Root tissue allows roots to exist and function below ground in moist, oxygenated conditions. This is not true of the trunk tissue of the root collar. The root collar is the lowest few inches of the trunk just above its juncture with the roots, typified by a flaring of the trunk at or just above ground level.


Root Collar

If there is constant moisture on the trunk tissue, the movement of oxygen and carbon dioxide in or out of the inner bark (phloem) is inhibited. Over time, this lack of gas exchange kills the phloem cells, resulting in restriction of the downward movement of plant food (photosynthate) to the roots. Roots are weakened and their ability to absorb water and nutrients is reduced, affecting the entire tree. Common symptoms of newly installed trees planted too deeply include yellow foliage, early fall color and leaf drop, twig dieback and branch death in the crown. Eventually, opportunistic pests and diseases may kill the tree.



The most frequently cited cause of root collar disorder is burial by soil and/or mulch. It occurs when trees are planted too deeply by error or with intent to bury the graft union, to prevent leaning or to restrict movement in windy sites. Root collar disorder may also occur when the root ball settles after transplanting when holes are dug too deeply and the tree gradually sinks into the landscape. Another cause is when mulch is piled against the trunk.

What if the tree installation process was correct (that is, the root ball was planted at ground level, the hole was not too deep and mulch was applied away from the trunk and at the recommended depth) and symptoms are still present? The answer then lies with nursery production practices (*see above right*).

NURSERY PRODUCTION PRACTICES

Trees can be purchased bare root, balled-and-burlapped (B&B) or containerized.

▲ Bare Root Stock
The best way to avoid root problems from nursery production practices is to buy bare root stock because the root collar is visible at point of purchase and at planting time. Additionally, bare root nursery stock is less expensive to purchase and transport and easier to handle than container or B&B nursery stock. However, bare root nursery stock is harvested dormant and is available only in early spring and late fall. Careful handling is required and size and species often are limited with this production method.

▲ Balled-and-Burlapped
B&B production practices may cause the root collar to be too deep in the root ball. The current trend toward more cultivation and less reliance on herbicides has led to more soil placed against trees during cultivation. The liner nursery stock may have been buried to increase stability. Another possibility may be the mechanical harvesting of trees planted too deeply at the nursery and never inspected for proper root depth.

▲ Containerized
Container production practices may cause the root collar to be too deep in the container. This sometimes happens when trees in containers are planted deeply to prevent blow down while held at the wholesale nursery. Also, the roots of liner nursery stock may be forced into containers that sharply bend the taproot and/or major branched roots, resulting in kinked or 'J' roots. Circling or girdling roots often occur if the tree has been left in the same container too long or transplanted into a larger container without treating the roots.

Impacts of Buried Root Collars on Trees

Trees with buried root collars are often weakened, stressed and predisposed to secondary pests and diseases. Buried root collars may stimulate the formation of adventitious roots near the soil surface from the trunk tissues. Adventitious roots attempt to compensate for the lack of oxygen not available to the buried roots. While the adventitious roots supply the tree with some water, nutrients and oxygen, they are not usually large enough to provide mechanical support for an older tree. Consequently, a tree may appear reasonably healthy, only to fail eventually as the main roots deteriorate to the point where they are no longer able to support the tree.

Trees with a root collar disorder usually lack a trunk flare, which differentiates the diagnosis of this problem. Often, symptoms do not show up immediately. Adventitious roots may mask the early symptoms of stem girdling roots. Several years may pass before stem compression becomes extensive enough to manifest symptoms. Structural defects occur when stem compression results in tissue death. Decay organisms invade the dead area and, if successful, weaken the wood near the root collar. Tree failure occurs when the holding capacity of the wood can no longer support the tree.

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